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EXAMINER

PHINNEY, JASON R

ART UNIT

PAPER NUMBER

2879

DATE MAILED: 04/23/2003

Please find below and/or attached an Office communication concerning this application or proceeding.

# Office Action Summary

Application No.

09/890,431

Applicant(s)

KATHIRGAMANATHAN,  
POOPATHY

Examiner

Jason Phinney

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

## Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

## Status

- 1) ☒ Responsive to communication(s) filed on 14 June 2002.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

## Disposition of Claims

- 4) ☒ Claim(s) 1-11, 13-15, 18-22 and 24-34 is/are pending in the application.
- 4a) Of the above claim(s) \_\_\_\_\_ is/are withdrawn from consideration.
- 5) ☐ Claim(s) \_\_\_\_\_ is/are allowed.
- 6) ☒ Claim(s) 1-6, 10, 11, 13-15, 18-22 and 24-31 is/are rejected.
- 7) ☒ Claim(s) 7-9 and 32-34 is/are objected to.
- 8) ☐ Claim(s) \_\_\_\_\_ are subject to restriction and/or election requirement.

## Application Papers

- 9) ☒ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 30 July 2001 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on \_\_\_\_\_ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

## Priority under 35 U.S.C. §§ 119 and 120

- 13) ☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☒ All b) ☐ Some \* c) ☐ None of:
- ☐ Certified copies of the priority documents have been received.
  - ☐ Certified copies of the priority documents have been received in Application No. \_\_\_\_\_.
  - ☒ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- \* See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

## Attachment(s)

- 1) ☒ Notice of References Cited (PTO-892) ✓
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948) ✓
- 3) ☒ Information Disclosure Statement(s) (PTO-1449) Paper No(s) 3 and 4
- 4) ☐ Interview Summary (PTO-413) Paper No(s) \_\_\_\_\_
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: \_\_\_\_\_

## DETAILED ACTION

### *Specification*

1. The specification is objected to as failing to provide proper antecedent basis for the claimed subject matter. See 37 CFR 1.75(d)(1) and MPEP § 608.01(o). Correction of the following is required: The specification fails to provide proper antecedent basis for Claims 19 and 20 in which the electron injecting material is specifically claimed.

2. Page 5, Line 29 through Page 6, Line 3 of the specification is objected to because of the following contradictory statement. The Anode is described as being formed of a transparent conductive material and then also described as being any low work function metal. The Examiner believes that the second description was intended to be of the Cathode.

3. This application does not contain an abstract of the disclosure as required by 37 CFR 1.72(b). An abstract on a separate sheet is required.

### *Claim Rejections - 35 USC § 112*

4. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

5. Claim 21 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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Claim 21 recites the limitation "in which the anode is a metal," the Examiner believes that this was intended to recite "in which the cathode is a metal" due to the fact that the claim depends upon Claim 11 which reads that the anode should be a "conductive glass or plastic material." The Examiner will treat claim 21 as reading that the cathode should be a metal for the purposes of examination.

6. Claim 22 is rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

Claim 22 recites the limitation a "device as claimed in claim 11 in which the anode is selected from the group consisting of aluminum alloy, magnesium alloy, lithium alloy, calcium alloy, and magnesium silver alloy" however, the device of claim 11 requires the anode to be a "conductive glass or plastic material." The examiner believes that Claim 22 was intended to define the materials used for the cathode and has treated it as such for the purposes of examination.

***Claim Rejections - 35 USC § 102***

7. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

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8. Claims 1-6 and 25 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by the article entitled "Anomalous Scattering by Praseodymium, Samarium and Gadolinium and Structures of their Ethylenediaminetetraacetate (edta) Salts" published in Acta Cryst. by Templeton.

Regarding Claim 1, Templeton discloses an electroluminescent material that emits light in the ultra-violet region of the spectrum and which comprises an organic metallic complex of a polyamine ligand and at least one selected from the group consisting of a transition metal, a lanthanide, and an actinide (See Table 1).

Regarding Claim 2, Templeton further discloses that the electroluminescent material should comprise gadolinium in the III state and a polyamine ligand (See Table 1).

Regarding Claim 3, Templeton further discloses that the ligand should be selected from the group consisting of EDTA, DCTA, DTPA and TTHA (See Table 1).

Regarding Claim 4, Templeton further discloses that the complex should be in the form of a salt (See Table 1).

Regarding Claim 5, Templeton further discloses that the complex should be in the form of an alkali metal salt (See Table 1).

Regarding Claim 6, Templeton further discloses that the salt should be selected from the group consisting of transition metal, lanthanide, and actinide salt (See Table 1).

Regarding Claim 25, Templeton further discloses that the electroluminescent material should comprise gadolinium in the III state and a ligand selected from the group consisting of EDTA, DCTA, DTPA and TTHA (See Table 1).

9. Claims 1, 2, 10, 11, 14, 15, 18, 19, 21, 22, and 26 are rejected under 35 U.S.C. 102(b) as being clearly anticipated by WO 98/55561 to Christou.

Regarding Claim 1, Christou discloses an electroluminescent material that emits light in the ultra-violet region of the spectrum (See Page 7, Lines 24-26) and which comprises an organic metallic complex of a polyamine ligand and at least one selected from the group consisting of a transition metal, a lanthanide, and an actinide (See Examples 9 and 16).

Regarding Claim 2, Christou further discloses that the electroluminescent material should comprise gadolinium in the III state and a polyamine ligand (See Examples 9 and 16).

Regarding Claim 10, Christou discloses an electroluminescent device (Figure 1, #10) with a first electrode of a transparent conductive substrate (#'s 1-2); a layer of a hole transmitting material (#3); a layer of an electroluminescent material which emits light in the ultraviolet region and which comprises an organic metallic complex of an polyamine ligand and either a transition metal, a lanthanide, or an actinide (#4, Page 7, Lines 24-26, and Examples 9 and 16); a layer of an electron transmitting material (#5); and a metal electrode (#6).

Regarding Claim 11, Christou further discloses that the transparent substrate is a conductive glass or plastic material, which acts as the anode (Page 13, Lines 15-19).

Regarding Claim 14, Christou further discloses that the hole transporting material should be an aromatic amine complex (Page 9, Lines 25-27).

Regarding Claim 15, Christou further discloses that the hole transporting material should be selected from the group consisting of poly(vinylcarbazole), N,N'-diphenyl-N,N'-bis(3-

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methylphenyl)-1,1'-biphenyl-4,4'-diamine (TPD), and polyaniline (Page 16, Example 2 and Page 9, Lines 22-27).

Regarding Claim 18, Christou further discloses that the electron injecting material should be mixed with the electroluminescent material and codeposited with it (Page 16, Lines 20-21 and Page 13, Lines 19-23).

Regarding Claim 19, Christou further discloses that the electron injecting material should be selected from the group consisting of a metal complex oxadiazole and an oxadiazole derivative (Page 16, Lines 20-21).

Regarding Claim 21, Christou further discloses that the cathode should be a metal (Page 16, Lines 24-25).

Regarding Claim 22, Christou further discloses that the cathode should be selected from the group consisting of an aluminum alloy, magnesium alloy, lithium alloy, calcium alloy, and magnesium silver alloy (Page 16, Lines 24-25).

Regarding Claim 26, Christou further discloses that the electroluminescent material should be an organic metallic complex of Gadolinium in the III state (See Examples 9 and 16).

### ***Claim Rejections - 35 USC § 103***

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

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11. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/55561 to Christou.

Regarding claim 13, WO 98/55561 to Christou discloses the claimed invention of Claim 10 including a hole transporting material mixed in with the electroluminescent material (Page 13, Lines 19-23) except for the limitation that the ratio should be 5 to 95% of the electroluminescent material to 95 to 5% of the hole transporting material. It has been held that where the general conditions of a claim are disclosed in the prior art, discovering the optimum or workable ranges involves only routine skill in the art. It would have been obvious to one having ordinary skill in the art at the time the invention was made to provide the ratio claimed, since optimization of workable ranges is considered within the skill of the art.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/55561 to Christou in view of U.S. Patent No. 5,247,226 to Sato.

Christou discloses the invention of Claims 10, 18 and 19 as described above.

Christou fails to exemplify that the electron injecting material should be selected from the group consisting of an aluminum quinolate and 2-(4-biphenyl)-5-(4-tert-butylphenyl)-1,3,4 oxadiazole.

Sato in an alternate organic EL device teaches that 2-(4-biphenyl)-5-(4-tert-butylphenyl)-1,3,4 oxadiazole (see formula Ka-9) is an appropriate choice for an electron injecting material due to the materials superior ability to accept and transport electrons injected from the cathode.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the electron transporting material taught by Sato in the device of



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Christou in order to take advantage of the material's superior ability to accept and transport electrons injected from the cathode.

13. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/55561 to Christou in view of U.S. Patent No. 5,126,214 to Tokailin.

Christou discloses the electroluminescent device of Claim 10 as described above.

Christou fails to exemplify that there should be at least one layer that incorporates a dye which fluoresces in the ultraviolet light to give emitted light in the color spectrum.

Tokailin in an alternate EL device teaches that coumarin and stilbene based dyes fluoresce in the ultraviolet light to give emitted light in the color spectrum

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to use the layer of dye taught by Tokailin in the electroluminescent device of Christou in order to alter the color of the emitted light.

14. Claims 27-31 are rejected under 35 U.S.C. 103(a) as being unpatentable over WO 98/55561 to Christou in view of the article entitled "Anomalous Scattering by Praseodymium, Samarium and Gadolinium and Structures of their Ethylenediaminetetraacetate (edta) Salts" published in Acta Cryst. by Templeton.

Christou discloses the electroluminescent device of Claim 10 as described above.

Regarding Claim 27, Christou fails to exemplify that the ligand should be selected from the group consisting of EDTA, DCTA, DTPA and TTHA

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Regarding Claim 28, Christou fails to exemplify that the complex should comprise both gadolinium in the III state and a ligand selected from the group consisting of EDTA, DCTA, DTPA and TTHA

Regarding Claim 29, Christou fails to exemplify that the complex should be in the form of a salt.

Regarding Claim 30, Christou fails to exemplify that the complex should be in the form of an alkali metal salt.

Regarding Claim 31, Christou fails to exemplify that the salt should be selected from the group consisting of transition metal, lanthanide, and actinide salt.

Templeton teaches the material of the alkali metal salt combining Na, Gd, and EDTA as shown in Table 1.

It would have been obvious to a person having ordinary skill in the art at the time the invention was made to substitute the electroluminescent material taught by Templeton for the material used by Christou in order to take advantage of its luminescent properties.

***Allowable Subject Matter***

15. Claims 7-9 and 32-34 are objected to as being dependent upon a rejected base claim, but would be allowable if rewritten in independent form including all of the limitations of the base claim and any intervening claims.

16. The following is a statement of reasons for the indication of allowable subject matter:

Regarding Claims 7 and 32, the prior art of record and relied upon fails to show or suggest the electroluminescent material having a formula  $\text{Ln}^*[\text{Ln}(\text{EDTA})]_3$  wherein  $\text{Ln}^*$  and  $\text{Ln}$

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are either the same or different and are selected from the group consisting of transition metals, lanthanides, and actinides. An EL material having the formula claimed would exhibit superior luminescence in the UV range.

Claims 8 and 33 further limit the above mentioned claims and as such also contain allowable subject matter for the above stated reasons.

Regarding Claims 9 and 34, the prior art of record and relied upon fails to show or suggest the electroluminescent material having a formula  $\text{Gd}[\text{Eu}(\text{EDTA})]_3$ . An EL material having the formula claimed would exhibit superior luminescence in the UV range.

### ***Conclusion***

Any inquiry concerning this communication or earlier communications from the examiner should be directed to Jason Phinney whose telephone number is (703) 305-3999. The examiner can normally be reached on M-F 7:30-4:00.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Nimesh Patel can be reached on (703) 305-4794. The fax phone numbers for the organization where this application or proceeding is assigned are (703) 308-7382 for regular communications and (703) 872-9319 for After Final communications.

Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is (703) 308-0956.


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JP 

April 10, 2003

  
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